IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. When strikethrough cannot easily be perceived, or when five or fewer characters are deleted, [[double brackets]] are used to show the deletion. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claim 22 in accordance with the following:

1. (ORIGINAL) A correlating polarimeter for correlating a received waveform of a wideband electromagnetic signal with a predetermined waveform, comprising:

a first antenna for receiving an electromagnetic signal;

a modulator interconnected with the first antenna for modulating the electromagnetic signal whereby a modulated electromagnetic signal results which contains a different polarization state for each frequency of the electromagnetic signal with the amplitude of each frequency component of the modulated electromagnetic signal being a function of the particular polarization state of each frequency component of the electromagnetic signal;

a linear polarizer configured to pass a first predetermined polarization of the modulated electromagnetic signal through a first output thereof;

a first receiver for receiving and demodulating the electromagnetic signal from the linear polarizer and outputting a received waveform; and

a correlator operatively interconnected with the first receiver and being configured to compare the received waveform to a predetermined waveform and output a correlation indicator.

2. (ORIGINAL) The correlating polarimeter of claim 1, further comprising an analog to digital converter operatively connected to the first receiver for converting the received waveform into a digital word and wherein the correlator comprises:

a memory device for storing the predetermined waveform; and

a processor operatively connected to the memory device and being configured to receive the digital word, compare the digital word to the predetermined waveform, and output the correlation indicator.

3. (ORIGINAL) The correlating polarimeter of claim 2, wherein the correlation indicator comprises a correlation factor.

4. (ORIGINAL) The correlating polarimeter of claim 1, wherein the first receiver comprises a detector and the processor is further configured to receive the digital word and calculate at least one component of a Stokes polarization vector of the electromagnetic signal.

5. (ORIGINAL) The correlating polarimeter of claim 4, wherein the processor calculates each component s0, s1, s2, and s3 of the Stokes polarization vector of the electromagnetic signal.

6. (ORIGINAL) The correlating polarimeter of claim 1, wherein the modulator comprises:

a first optically thick retarder of birefringent material wherein a fast and a slow axes of the retarder define respective x and y axes of a rectangular coordinate system; and

a second optically thick retarder of birefringent material and wherein the fast axis of the first optically thick retarder forms an angle of approximately forty-five degrees to the fast axis of the second optically thick retarder.

7. (ORIGINAL) The correlating polarimeter of claim 6, wherein the first and second optically thick retarders are coated with a material comprising MYLAR.

8. (ORIGINAL) The correlating polarimeter of claim 4, wherein the processor applies a Fourier transform to the digital word.

9. (ORIGINAL) The correlating polarimeter of claim 4, further comprising a second antenna located between the linear polarizer and the first receiver.

10. (ORIGINAL) The correlating polarimeter of claim 9, wherein the second antenna comprises a horn antenna.

11. (ORIGINAL) The correlating polarimeter of claim 9, further comprising:

at least one focusing lens and at least one re-focusing lens that are interleaved with the retarders, the linear polarizer and/or the second antenna; and

an amplifier connected in circuit with the second antenna.

12. (ORIGINAL) The correlating polarimeter of claim 11, wherein the at least one focusing lens and the at least one re-focusing lens each comprise a surface having a groove.

13. (ORIGINAL) The correlating polarimeter of claim 1, wherein the linear polarizer comprises a wire grid.

14. (ORIGINAL) The correlating polarimeter of claim 4, wherein the linear polarizer is configured to pass a second predetermined polarization of the modulated electromagnetic signal through a second output thereof.

15. (ORIGINAL) The correlating polarimeter of claim 14, further comprising:

a transmitter for transmitting the electromagnetic signal for reflection from a target;

a circulator interconnected with the transmitter, the second antenna and the first receiver;

a second receiver employed to receive the second predetermined polarization of the modulated electromagnetic signal; and

a power combiner employed to combine the modulated electromagnetic signal received by each of the first and second receivers.

16. (ORIGINAL) The correlating polarimeter of claim 15, wherein the power combiner outputs the combined modulated electromagnetic signal which is used to determine at least one of a target range, a Doppler measurement and a temperature.

17. (ORIGINAL) The correlating polarimeter of claim 16, wherein the electromagnetic signal is within the radar band.

18. (ORIGINAL) The correlating polarimeter of claim 16, wherein the electromagnetic signal comprises a microwave frequency.

19. (ORIGINAL) The correlating polarimeter of claim 16, wherein the electromagnetic signal comprises a frequency from the visible spectrum.

20. (ORIGINAL) The correlating polarimeter of claim 16, wherein the electromagnetic signal comprises a frequency from the infra-red spectrum.

21. (ORIGINAL) A correlating device for correlating the polarimetry of a wideband electromagnetic signal reflected from a target, the correlating device comprising:

a first antenna for receiving the electromagnetic signal;

a modulator interconnected with the first antenna for modulating the electromagnetic signal, the modulator comprising:

a first optically thick retarder of birefringent material wherein a fast and a slow axes of the first optically thick retarder define respective x and y axes of a rectangular coordinate system; and

a second optically thick retarder of birefringent material and wherein the fast axis of the first optically thick retarder forms an angle of approximately forty-five degrees to the fast axis of the second optically thick retarder;

a linear polarizer configured to pass a first predetermined polarization of the modulated electromagnetic signal through a first output thereof and to pass a second predetermined polarization of the modulated electromagnetic signal through a second output thereof;

a first receiver comprising a detector for receiving and demodulating the modulated electromagnetic signal from the linear polarizer;

an analog to digital converter connected to the detector for converting the modulated electromagnetic signal into a digital word;

a memory device for storing a predetermined waveform;

a processor operatively connected to the memory device and being configured to receive the digital word;

a processor operatively connected to the memory device and being configured to receive the digital word and calculate at least one component of a Stokes polarization vector of the electromagnetic signal and wherein the processor is also configured to compare the digital word to the predetermined waveform, and output a correlation indicator; and

the correlating device further comprising:

a transmitter for transmitting the electromagnetic signal;

a second receiver employed to receive the second predetermined polarization of the modulated electromagnetic signal; and

a power combiner employed to combine the modulated electromagnetic signal received by each of the first and second receivers.

22. (CURRENTLY AMENDED) A correlating polarimeter for correlating a received waveform of a reflected wideband electromagnetic signal to a predetermined waveform, the polarimeter comprising:

means for receiving an electromagnetic signal;

means for modulating the electromagnetic signal being interconnected with the receiving means whereby a modulated electromagnetic signal results which contains a different polarization state for each frequency of the electromagnetic signal with the amplitude of each frequency component of the modulated electromagnetic signal being a function of the particular polarization state of each frequency component of the electromagnetic signal;

means for linearly polarizing the modulated electromagnetic signal;

means for demodulating the modulated electromagnetic signal output from the linear polarizer, the demodulating means outputting a received waveform; and

means for correlating the received waveform to a predetermined waveform and outputting a correlation indicator and wherein the correlating means is operatively connected to the ~~first receiver~~ receiving means.

23. (ORIGINAL) The correlating polarimeter of claim 22, wherein the modulator means comprises:

a first optically thick retarder of birefringent material wherein a fast and a slow axes of the retarder define respective x and y axes of a rectangular coordinate system; and

a second optically thick retarder of birefringent material and wherein the fast axis of the first optically thick retarder forms an angle of approximately forty-five degrees to the fast axis of the second optically thick retarder.

24. (ORIGINAL) A method for correlating a received waveform of a reflected wideband electromagnetic signal to a predetermined waveform, the method comprising:

receiving an electromagnetic signal;

modulating the electromagnetic signal to obtain a modulated electromagnetic signal containing a different polarization state for each frequency of the electromagnetic signal with the amplitude of each frequency component of the modulated electromagnetic signal being a function of the particular polarization state of each frequency component of the electromagnetic signal, the electromagnetic signal being modulated at a microwave frequency;

linearly polarizing the modulated electromagnetic signal;

demodulating the modulated electromagnetic signal output from the linear polarizer and outputting a received waveform; and

correlating the received waveform to a predetermined waveform and outputting a correlation indicator.

25. (ORIGINAL) A correlating polarimeter for correlating Stokes vector components of a received waveform of a wideband electromagnetic signal with a predetermined set of Stokes vector components, comprising:

a first antenna for receiving an electromagnetic signal;

a modulator interconnected with the first antenna for modulating the electromagnetic signal whereby a modulated electromagnetic signal results which contains a different polarization state for each frequency of the electromagnetic signal with the amplitude of each frequency component of the modulated electromagnetic signal being a function of the particular polarization state of each frequency component of the electromagnetic signal;

a linear polarizer configured to pass a first predetermined polarization of the modulated electromagnetic signal through a first output thereof;

a first receiver for receiving and demodulating the electromagnetic signal from the linear polarizer and outputting a received waveform; and

at least one processor operatively connected to the first receiver for inputting the received waveform and calculating at least one component of the Stokes polarization vector and the at least one processor being configured to compare the at least one component of the Stokes polarization vector to at least one predetermined component of a predetermined Stokes polarization vector and output a correlation indicator.

26. (ORIGINAL) The correlating polarimeter of claim 25, wherein:

the at least one component of the Stokes polarization vector comprises each of s0, s1, s2, and s3; and

the at least one predetermined component of the predetermined Stokes polarization vector comprises each of s0, s1, s2, and s3.